Effectiveness of Yoga Intervention on Menstrual Pain Menstrual Distress Perceived Stress and Biomarkers in Working Women with Primary Dysmenorrhea

BY

Taruni Sarva
PH2022-168

Co-Supervisor:
Dr. Indu Sharma
Assistant Professor
MDNIY, Delhi

Supervisor:
Dr. Padmakar
Assistant Professor
LNIPE, Gwalior

A

Synopsis

Submitted to the Department of Yogic Sciences

Lakshmibai National Institute of Physical Education,

Gwalior (MP), India.

For the Award of the Degree of

Doctor of Philosophy in Yogic Science

DEPARTMENT OF YOGIC SCIENCE

CERTIFICATE

I hereby declare that the synopsis "**Effectiveness of Yoga Intervention on Menstrual Pain Menstrual Distress Perceived Stress and Biomarkers in Working Women with Primary Dysmenorrhea"** being submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in Yoga under the Department of Yogic Sciences, Lakshmibai National Institute of Physical Education (LNIPE), Gwalior, Madhya Pradesh, India, during the academic year 2022-2023.

It is a bonafide record of original work carried out under the supervision of Dr. Padmakar and the co-supervision of Dr. Indu Sharma has not been submitted in full or part to any other university or institute for a degree or diploma.

Taruni Sarva

PH2022-168

Dr. Padmakar

Assistant Professor,

LNIPE, Gwalior

(Chairman, DRC)

Abstract

Dysmenorrhea is the most common problem in women; it is commonly referred to as painful cramps in the lower abdomen occurring just before or during menstruation and is a prevalent condition affecting many women globally. It can significantly impact the quality of life, leading to absenteeism from work and social activities. This study investigates the effectiveness of a yoga intervention in alleviating menstrual pain, menstrual distress, perceived stress, and biomarkers in working women diagnosed with primary dysmenorrhea. This study will be conducted involving 40 working women with primary dysmenorrhea. Participants will be randomly assigned to either the intervention group or a control group. The experimental group will follow the yoga intervention for five days per week for 3 months, and the control group will not follow any interventions. The pre- and post-intervention assessments will include the Verbal Multidimensional Scoring System, Numeric Pain Rating Scale, Menstrual Distress Questionnaire, Perceived Stress Scale, and selected physiological biomarker tests. This study is expected to demonstrate significant improvements in pain intensity, reduction in perceived stress, and changes in biomarker levels in the yoga group compared with the control group. These findings may suggest that yoga could serve as an effective and holistic intervention for managing primary dysmenorrhea in working women. This study examines how yoga might affect and benefit working women experiencing dysmenorrhea, focusing on related physiological and psychological changes.

Keywords: Menstrual Cycle; Pelvic Pain; Cramps; Painful Menstruation; Yoga; Therapeutic; Complementary Therapy; Stress; Working Women.

CONTENTS

S. No.	Description	Page No.
1.	Introduction	5-6
2.	Literature Review	7-12
3.	Research Methodology	13
4.	Collection of Data	14
5.	Statistical Analysis	14
6.	Expected Outcome	15
	References	16-19

INTRODUCTION

Dysmenorrhea, or painful menstruation, is the most common menstrual problem during adolescence and affects women worldwide. Its impact is significant, often disrupting quality of life and leading to missed work or social engagements. Menstrual disorders are a widespread global health concern for women. Pain during menstruation without an identifiable pathologic lesion is known as primary dysmenorrhea (Davis et al., 2005). The most common sign of dysmenorrhea is cramping in the lower abdomen, although other symptoms include headaches, backaches, nausea, vomiting, and dizziness during menstruation (Dwi Hareni et al., 2023; Klein & Litt, 1981).

According to a study, 71.96% of adolescent girls reported having dysmenorrhea, with 33.95% reporting it on a monthly basis and 16.90% reporting it on most months (Agarwal&Agarwal, 2010). Between 45% and 95% of women in the world who are of reproductive age suffer from dysmenorrhea, which causes significant disruptions in daily life, such as decreased productivity at work and in school (Kirsch et al., 2024).

According to a study by Chauhan&Kodnani (2016), 85% of girls had a family history of dysmenorrhea, 67% had moderate to heavy flow, and 28% of participants had irregular periods. Significant consequences of dysmenorrhea were low performance (56%), trouble with everyday tasks (73%), disturbance of social life (64%), and school absences (65%). According to Chauhan and Kodnani (2016), the most frequently reported psychological symptoms were irritability (61%) and emotional instability (46%), whereas the most frequently reported physical symptoms were backache (35%) and lower stomach discomfort (42%). About 75% of teenagers and 25% to 50% of adult women have menstrual pain. According to Harlow&Campbell (2004), 5–20% of women report having severe dysmenorrhea that interferes with their ability to do daily tasks.

Working women are more prone to a variety of health issues, including lifestyle disorders, work-related injuries, and reproductive and pregnancy issues. Dysmenorrhea is one of the leading causes of absenteeism in working women.

Menstrual distress is a significant concern that can profoundly impact women's daily lives. Research has shown that the severity of premenstrual symptoms can significantly affect activities of daily living (Dennerstein et al., 2010). Moreover, dysmenorrhea, or painful menstrual cramps, is a common condition that is often associated with menstrual distress (Chakra Artai, 2023). A study found that the

practice of yoga exercise can be applied as an alternative method to reducing menstrual pain and as a reference to adolescent girls about the non-pharmacological treatment of dysmenorrhea (Carolin et al., 2022).

Yoga is an ancient mind-body practice that includes meditation or relaxation, physical postures called asanas, and breathing exercises called pranayama (Barcikowska et al., 2020). As a complementary and alternative medicine (CAM) for pain management and stress reduction, it has grown more and more recognized (Nayak et al., 2022). Its benefits include being a cost-effective and easily accessible intervention with minimal reported side effects (Miri et al., 2024). A potential area of alternative medicine is yoga. Physical postures, breathing exercises, and relaxation or meditation to reduce stress and improve physical fitness (Yang and Kim 2016). An increasing amount of research indicates that yoga and meditation can enhance mental and physical well-being by suppressing the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis. Additionally, yoga is essential for stress reduction, increasing the activity of the parasympathetic system, reducing sympathetic activity, and improving overall health (Nag&Kodali, 2013; Yang&Kim, 2016).

Yoga has been found to be an alternative medicine with low cost and low risk; thus, it is worth considering for the management of primary dysmenorrhea. To date, we have found only one randomized controlled trial demonstrating that three yoga poses (cobra, cat, and fish poses) were beneficial in the management of the severity and duration of primary dysmenorrhea (Rakhshaee, 2011). However, the effect of yoga on the quality of life (QOL) and physical fitness of young women with primary dysmenorrhea has not yet been examined. This study aimed to investigate the therapeutic effects of yoga on the severity of menstrual pain, QOL, and physical fitness in a sample of 34 young women with primary dysmenorrhea.

This study aimed to observe the effects of yoga intervention on pain intensity, pain duration, menstrual distress, perceived stress, and biomarker levels in working women with primary dysmenorrhea. This holistic approach not only addresses the physiological aspects of primary dysmenorrhea but also emphasizes its psychological dimensions, fostering a more comprehensive understanding of women's health. As more women seek effective solutions for menstrual discomfort, integrating yoga into their wellness routines could offer both immediate relief and long-term benefits, ultimately enhancing their quality of life and productivity.

REVIEW OF RELATED LITERATURE

The following literature reviews provide a more comprehensive understanding of this present study as follows:

- Kanchibhotla et al., (2023), in this narrative review, reported that there are several studies that examined the impact of a varied yoga set of 39 asanas, 5 pranayamas, and yoga nidra on dysmenorrhea. The studies demonstrated a significant relief in dysmenorrhea among those who practiced yoga (asanas/pranayama/yoga nidra), with improved pain tolerance and reduced stress levels and benefits of yoga in reducing the dysmenorrhea. While few studies have demonstrated the positive effects of yoga in treating dysmenorrhea, several more have focused on other menstrual disorders.

- Haryono et al., (2023) found that this study aimed to determine how yoga exercise affected the reduction of pain scales in students with dysmenorrhea. The study divided the participants into two groups: the yoga group (n = 25) and the control group (n = 25). The study was conducted for 12 weeks, three days a week, and each session lasted 30 minutes. Dysmenorrhea was assessed using a WaLIDD scale and the Numerical Rating Scale (NRS); the yoga group's NRS was significantly lower than that of the control group ($p=0.027$ and <0.01, respectively). These findings suggest that Hatha yoga significantly reduces pain intensity in women with primary dysmenorrhea, as shown by the study's various statistical analyses.

- Kachapeswaran&R. Elangovan, (2022) The study involved 120 adolescent girls aged between 18 and 22 years suffering from dysmenorrhea. After screening, 30 girls were randomly selected and divided into an experimental and control group. The experimental group underwent yogic practices for 3 months, six days a week. The results were statistically significant (p-value=0.05), and the study found that the experimental group showed a significant reduction in menstrual frequency compared to the control group. In conclusion, the study demonstrates that yogic practices can effectively reduce menstrual frequency among adolescent girls suffering from dysmenorrhea.

- Prabhu et al., (2019) This study examined the impact of yoga asanas on menstrual cramps in 80 young adult females aged between 18 and 25. Subjects were divided into experimental (n=40) and control groups (40). The experimental group was made to perform yogasanas, while the control group was made to perform core exercises for 4 sessions/week. Assessments using the Verbal Multidimensional Scoring System (VMSS), Moo's Menstrual Distress Questionnaire, and the Perceived Stress Scale showed significant improvement in the yogasana group. The findings indicate that yogic practices effectively reduce menstrual pain and stress.

- Yonglitthipagon et al., (2017) This study was to investigate the effect of a specially designed yoga program on the menstrual pain, physical fitness, and quality of life (QOL) of non-athlete women with primary dysmenorrhea aged 18–22 years. 34 volunteers were randomly assigned into control and yoga groups. Menstrual pain, physical fitness, and QOL were evaluated at baseline and at the end of the 12-week study period. The yoga group was asked to practice yoga for 30 min per day, twice a week, for 12 weeks at home, while the control group did not receive any form of exercise over the study period. There were significant improvements in menstrual pain, physical fitness, and QOL in the yoga group more than in the control group.

- Fitriana&Pradnyandari (2019**)** This study was to investigate the effect of yoga on the level of period pain in female students of nursing. It is a quasi-experimental study with pre-test and post-test without control. This study shows the significant difference in the Visual Analogue Scale in 20 subjects with dysmenorrhea.

- Satyanand et al., (2014) in this study selected 100 patients as subjects; among them, 50 participants in the case group were asked to attend a 45-minute yoga class every day for a period of 3 months. The visual analogue scale (VAS) was used to measure the pain severity for both groups. The results of this study showed that yoga and relaxation techniques are better and more beneficial therapies in the management of irregular menstruation and reducing the pain during menstruation.

- Nag&Kodali, (2013) analyzed the effect of yoga and meditation as alternative therapy for primary dysmenorrhea in young students and its outcome on school absenteeism. About 113 unmarried medical students with primary dysmenorrhea from Dr. Pinnamaneni Siddhartha Medical College were randomly assigned to study (n = 60) and control groups (n = 53). The semi-structured questionnaire and the numerical rating scale for pain were administered to all the participants at baseline. The study group was subjected to yoga, pranayama, and meditation for three months. The findings observed a significant ($p<0.0001$) reduction in the perceived pain after yoga intervention in the study group. 83.33% of the study group reported complete pain relief, and 11.66% reported mild pain. The control group showed no reduction in pain. After the yoga intervention, absenteeism dropped to 10.3%, and improvements in daily activities were observed in the study group. The study concluded that meditation and yoga could serve as a viable alternative therapy for primary dysmenorrhea in young students.

- Rani et al., (2013) had done a study to observe the effect of Yoga Nidra practice on hormone levels in patients who had menstrual irregularities. This study was a randomized controlled trial and involved 150 subjects with menstrual irregularities, 126 of whom completed the protocol. Each subject was randomly assigned to one of the two groups: (1) conventional medication + yoga nidra or (2) conventional medication only. The yogic intervention duration was 35–40 minutes per day, five times per week for 6 months. An estimation of hormonal profile was done for both groups at baseline and after 6 months. The findings of the study are that Yoga Nidra practice was helpful in patients with hormone imbalances, such as dysmenorrhea, oligomenorrhea, menorrhagia, metrorrhagia, and hypomenorrhea. The intervention group found significant changes in thyroid-stimulating hormone, follicle-stimulating hormone, luteinizing hormone, and prolactin compared with the control group.

- Rakhshaee (2011) found that this study assessed the three yoga poses (Cobra, Cat, and Fish Poses) that can reduce the severity and duration of primary dysmenorrhea. In this study 92 girl students, 18-22 years old, were randomly assigned to an experimental group (n=550) and a control group (n=542). The Visual Analog Scale for Pain was used to assess the intensity of pain and the pain duration and shows the significant difference in the pain intensity and pain duration in the post-tests compared with the pretest in the yoga group. The results showed that compared with the control group, there was a significant difference in the pain intensity and pain duration in the experimental group.

Statement of the Problem

The statement of the problem is the effect **of yoga intervention on menstrual pain, menstrual distress, perceived stress, and biomarkers in working women with primary dysmenorrhea.**

Objectives of the Study

- To determine the effect of yoga intervention on pain, menstrual distress, perceived stress, and biomarkers in an experimental group of working women.

- To determine whether there is a significant difference between the means of experimental and control groups.

Research Question

- Is there any significant effect of yoga intervention on pain intensity and pain duration in working women?
- Is there any significant effect of yoga intervention on menstrual distress in working women?
- Is there any significant effect of yoga intervention on perceived stress in working women?

- Is there any significant effect of yoga intervention on the level of biomarkers in working women?

Hypotheses

On the basis of review of related literature and discussion with experts:

- It is hypothesized that there will be a significant effect of yoga intervention on pain, menstrual distress, perceived stress, and biomarkers in the experimental group of working women.
- It is hypothesized that there will be a significant difference between the mean scores of experimental and control groups.

Delimitations

- The study is delimited to 40 working women selected from different occupations.
- The study is delimited to the age between 20-35 years.
- The study is delimited to regular menstrual cycle.
- The study is confined to the following variables:
  - Pain, menstrual distress, perceived stress, and biomarker levels.
- This study is delimited to moderate to severe pain intensity on the numeric pain rating scale.
- This study is further delimited to 12 weeks of yoga intervention.

Definition and Explanation of Terms

- **Dysmenorrhea:** Dysmenorrhea is defined as painful menstrual cramps of uterine origin and is considered one of the most common gynecological disorders among females of childbearing age. Although it is a common condition, it is usually underdiagnosed, since most females do not seek medical attention. In accordance with its pathophysiology, it is classified as either primary or secondary dysmenorrhea (SD).

- **Primary dysmenorrhea (PD):** Defined as spasmodic and painful cramps in the lower abdomen that begin shortly before or at the onset of menses in the absence of any pelvic pathology.

- **Prostaglandin (biomarker):** Prostaglandins are a group of lipids with hormone-like actions that your body makes primarily at sites of tissue damage or infection. There are several different types of prostaglandins, and they play several essential roles in regulating bodily processes, including. Blood clot formation at the site of an injury, blood flow, healing inflammation, labor induction, pregnancy, menstruation, and ovulation.

Significance of the Study

- The study may help to reduce pain intensity and pain duration in working women with dysmenorrhea.
- The study may help to reduce the menstrual distress (symptoms) in working women and increase the quality of life of working women.
- The study may help to reduce perceived stress levels in working women.
- The study may help to reduce the level of prostaglandin F2α and E2 in working women.

RESEARCH METHODOLOGY

In this chapter, the procedure adopted for the selection of subjects, sample size and selection of variables, experimental design, plans of analysis tests and criterion measures, procedure of testing, training schedule, collection of data, and statistical technique employed for the analysis of data is presented.

Selection of Subjects

- For this study, working women will be selected from different occupations. A total of 40 subjects will be selected for the study.
- Further, they will be randomly divided into two groups: one experimental and the other one will be the control group. Each group has 20 subjects.
- The age of the subject will range from 20 to 35 years.

Selection of Variable

- MenstrualPain
- Menstrual distress
- Perceived Stress
- Biomarker

Selection of Instruments

- Verbal multidimensional scoring system (VMSS)
- Numeric Pain Rating Scale (NPRS)
- Menstrual distress questionnaire
- Perceived Stress Scale
- Laboratory blood test or urine test

Design of Study

- A pre-test-post-test research design is followed for this study.
- Pre-test data will be collected before the yoga intervention at baseline, and post-test data will be collected after 12 weeks.

Collection of Data

- 40 subjects will be selected and further divided into two groups of 20 subjects each. The one group will receive yoga intervention, and the other group is the control group with no intervention.
- The screening will be done by the Verbal Multidimensional Scoring System. Then the data will be collected at pre-test and post-test stages, and the pre-test will be collected before the yoga intervention, and post-test data will be collected after 12 weeks.
    - **Yoga Intervention:** Yoga intervention will be given for 5 sessions per week for 3 months for 60 minutes. It includes asanas, pranayama, and deep relaxation techniques.

Statistical Analysis

- For assessing the data of the study, descriptive statistics will be used.
- **A paired t-test** will be used for statistical analysis within the group, and an **independent t-test** will be used for calculating the mean difference between the groups.
- The statistical significance level will be at 0.05 levels.

Expected Outcome of the Research

The study may help to reduce pain intensity and pain duration, menstrual distress (symptoms), perceived stress, and levels of biomarker levels in working women with dysmenorrhea in the yoga group compared with the control group.

These findings may suggest that yoga could serve as an effective and holistic intervention for managing primary dysmenorrhea in working women. This study examines how yoga might affect and benefit working women experiencing dysmenorrhea, focusing on related physiological and psychological changes.

References

- Davis, A. R., Westhoff, C., O'Connell, K., & Gallagher, N. (2005). Oral Contraceptives for Dysmenorrhea in Adolescent Girls: A Randomized Trial. *Obstetrics&Gynecology*, *106*(1), 97–104. https://doi.org/10.1097/01.AOG.0000165826.03915.65
- Dwi Hareni, N., Astuti, A., & Abidin, Z. (2023). Yoga Practice on Reducing Menstrual Pain Intensity (Dysmenorrhea) in Adolescent Girls: Literature Review. *Health and Technology Journal (HTechJ)*, *1*(2), 196–204. https://doi.org/10.53713/htechj.v1i2.35
- Klein, J. R., & Litt, I. F. (1981). Epidemiology of adolescent dysmenorrhea. *Pediatrics*, *68*(5), 661–664.
- Agarwal, A. K., & Agarwal, A. (2010). A study of dysmenorrhea during menstruation in adolescent girls. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive&Social Medicine*, *35*(1), 159–164. https://doi.org/10.4103/0970-0218.62586
- Kirsch, E., Rahman, S., Kerolus, K., Hasan, R., Kowalska, D., Desai, A., & Bergese, S. (2024). Dysmenorrhea, a Narrative Review of Therapeutic Options. *Journal of Pain Research*, *Volume 17*, 2657–2666. https://doi.org/10.2147/JPR.S459584
- Chauhan, G., & Kodnani, A. (2016). A study of prevalence and impact of dysmenorrhea and its associated symptoms among adolescent girls residing in slum areas of Vadodara city, Gujarat. *International Journal of Medical Science and Public Health*, *5*(3), 510. https://doi.org/10.5455/ijmsph.2016.20102015145
- Harlow, S. D., & Campbell, O. M. R. (2004). Epidemiology of menstrual disorders in developing countries: A systematic review. *BJOG: An International Journal of*

Obstetrics&Gynaecology, *111*(1), 6–16. https://doi.org/10.1111/j.1471-0528.2004.00012.x

- Dennerstein, L., Lehert, P., & Heinemann, K. (2012). Epidemiology of premenstrual symptoms and disorders. *Menopause International*, *18*(2), 48–51. https://doi.org/10.1258/mi.2012.012013
- A. C. (2023). Prevalence of Dysmennorrhea among Women. *International Journal For Multidisciplinary Research*, *5*(4), 4682. https://doi.org/10.36948/ijfmr.2023.v05i04.4682
- Carolin, B. T., Maesari, I., & Hisni, D. (2022). Yoga Exercise on Reduction of Menstrual Pain among Adolescent Girls. *Nursing and Health Sciences Journal (NHSJ)*, *2*(2), 29–33. https://doi.org/10.53713/nhs.v2i2.86
- Barcikowska, Z., Rajkowska-Labon, E., Grzybowska, M. E., Hansdorfer-Korzon, R., & Zorena, K. (2020). Inflammatory Markers in Dysmenorrhea and Therapeutic Options. *International Journal of Environmental Research and Public Health*, *17*(4), 1191. https://doi.org/10.3390/ijerph17041191
- Nayak, S. G., George, D. L. S., Assariparambil, A. R., George, A., Rao, D. K. S., K, D. A., Bhat, Dr. V. R., & N, D. R. (2022). Meditation and yoga impact on dysmenorrhea (MY-ID): A study protocol. *F1000Research*, *11*, 590. https://doi.org/10.12688/f1000research.111219.1
- Miri, H., Rezaeipor, H., & Zareiyan, A. (2024). The Effect of a Course of Yoga Exercises on Menstrual Pain and Distress in Women with Primary Dysmenorrhea with and Without Lumbar Hyperlordosis. *Journal of Archives in Military Medicine*, *12*(3). https://doi.org/10.5812/jamm-156368

- Yang, N.-Y., & Kim, S.-D. (2016). Effects of a Yoga Program on Menstrual Cramps and Menstrual Distress in Undergraduate Students with Primary Dysmenorrhea: A Single-Blind, Randomized Controlled Trial. *The Journal of Alternative and Complementary Medicine*, *22*(9), 732–738. https://doi.org/10.1089/acm.2016.0058
- Nag, U., & Kodali, M. (2013). *MEDITATION AND YOGA AS ALTERNATIVE THERAPY FOR PRIMARY DYSMENORRHEA*. *03*.
- Rakhshaee, Z. (2011). Effect of Three Yoga Poses (Cobra, Cat and Fish Poses) in Women with Primary Dysmenorrhea: A Randomized Clinical Trial. *Journal of Pediatric and Adolescent Gynecology*, *24*(4), 192–196. https://doi.org/10.1016/j.jpag.2011.01.059
- Haryono, I. R., Sudarman, J. P., Prastowo, N. A., & Lilis, L. (2023). The

effect of Hatha Yoga on pain intensity in severe primary dysmenorrhea among students: A randomized controlled trials. *JNKI (Jurnal Ners Dan Kebidanan Indonesia) (Indonesian Journal of Nursing and Midwifery)*, *11*(1), 95. https://doi.org/10.21927/jnki.2023.11(1).95-105

- Kachapeswaran, G. & R. Elangovan. (2022). *EFFECT OF YOGIC PRACTICES ON SELECTED RISK FACTORS AMONG ADOLESCENT GIRLS SUFFERING WITH DYSMENORRHEA*. Unpublished. https://doi.org/10.13140/RG.2.2.28231.37280
- Kanchibhotla, D., Subramanian, S., & Singh, D. (2023). Management of Dysmenorrhea Through Yoga: A Narrative Review. *Frontiers in Pain Research*, *4*, 1107669. https://doi.org/10.3389/fpain.2023.1107669
- Nag, U., & Kodali, M. (2013). *MEDITATION AND YOGA AS ALTERNATIVE THERAPY FOR PRIMARY DYSMENORRHEA*. *03*.
- Rani, M., Singh, U., Agrawal, G. G., Natu, S. M., Kala, S., Ghildiyal, A., & Srivastava, N. (2013). Impact of Yoga *Nidra* on Menstrual Abnormalities in Females of

Reproductive Age. *The Journal of Alternative and Complementary Medicine*, *19*(12), 925–929. https://doi.org/10.1089/acm.2010.0676

- Satyanand, V., Hymavathi, K., Panneerselvam, E., Mahaboobvali, S., Basha, S. A., & Shoba, C. (2014). *Effects of Yogasanas in the Management of Pain during Menstruation*. *2*(11).
- Yonglitthipagon, P., Muansiangsai, S., Wongkhumngern, W., Donpunha, W., Chanavirut, R., Siritaratiwat, W., Mato, L., Eungpinichpong, W., & Janyacharoen, T. (2017). Effect of yoga on the menstrual pain, physical fitness, and quality of life of young women with primary dysmenorrhea. *Journal of Bodywork and Movement Therapies*, *21*(4), 840–846. https://doi.org/10.1016/j.jbmt.2017.01.014
- Prabhu, Sancheti, P., & Sancheti Institute College Of Physiotherapy, Sancheti Healthcare Academy, 11/12 Thube Park, Shivajinagar, Pune – 411005, Maharashtra, India. (2019). EFFECT OF YOGASANAS ON MENSTRUAL CRAMPS IN YOUNG ADULT FEMALES WITH PRIMARY DYSMENORRHEA. *International Journal of Physiotherapy and Research*, *7*(4), 3129–3134. https://doi.org/10.16965/ijpr.2019.140
- Fitriana, L. B., & Pradnyandari, N. P. (n.d.). *THE EFFECTS OF YOGA PRACTICE ON THE LEVEL OF PERIOD PAIN AMONG FEMALE STUDENTS OF NURSING PROGRAM AT RESPATI UNIVERSITY, YOGYAKARTA*.